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Desjardins

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(54) **RESONANT SUPPRESSOR FOR RECORD
PLAYER TONE ARM**

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Related U.S. Application Data

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26, 2022.

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G11B 3/31 (2006.01)

(52) **U.S. Cl.**
CPC **G11B 3/31** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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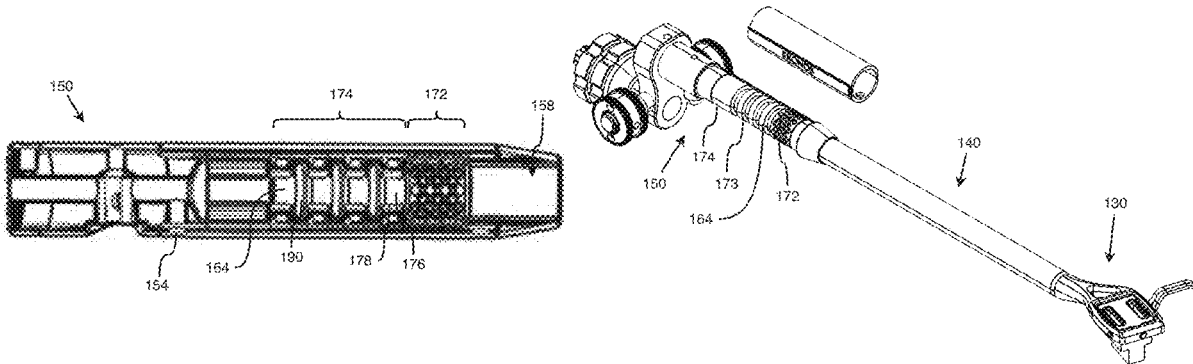
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(57) **ABSTRACT**

A tone arm for a record player is provided. The tone arm comprises an anterior arm section adapted for mounting a pickup cartridge thereto, an posterior arm section adapted for mounting to the record player, and a mounting component comprising a plurality of discrete contact surfaces that adapted for abutting one of i) anterior arm section and ii) the posterior arm section, and preferably discrete contact surfaces for each of the anterior arm section and the posterior arm section. Whereby, the mounting component is adapted to secure the anterior arm section and the posterior arm section to each other. Therefore, through the present document is described the mounting component, the tone arm, and a method of making the latter with the mounting component.

17 Claims, 14 Drawing Sheets



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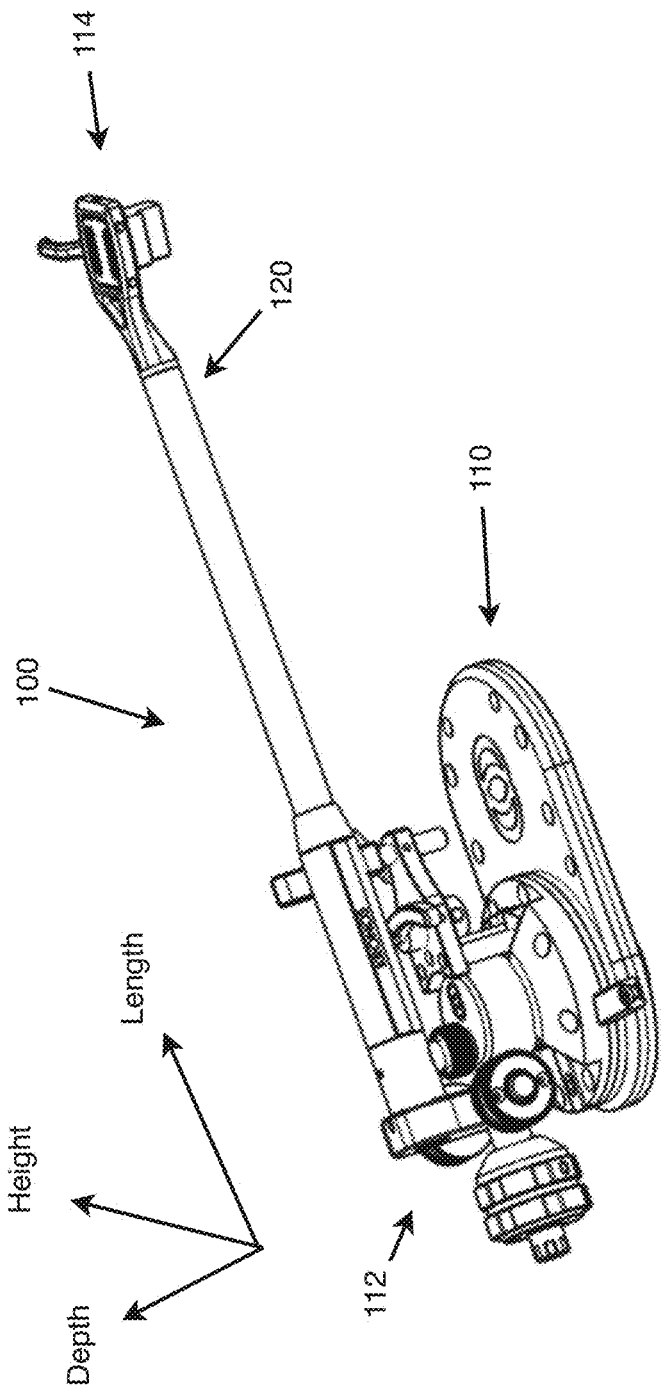


Fig. 1

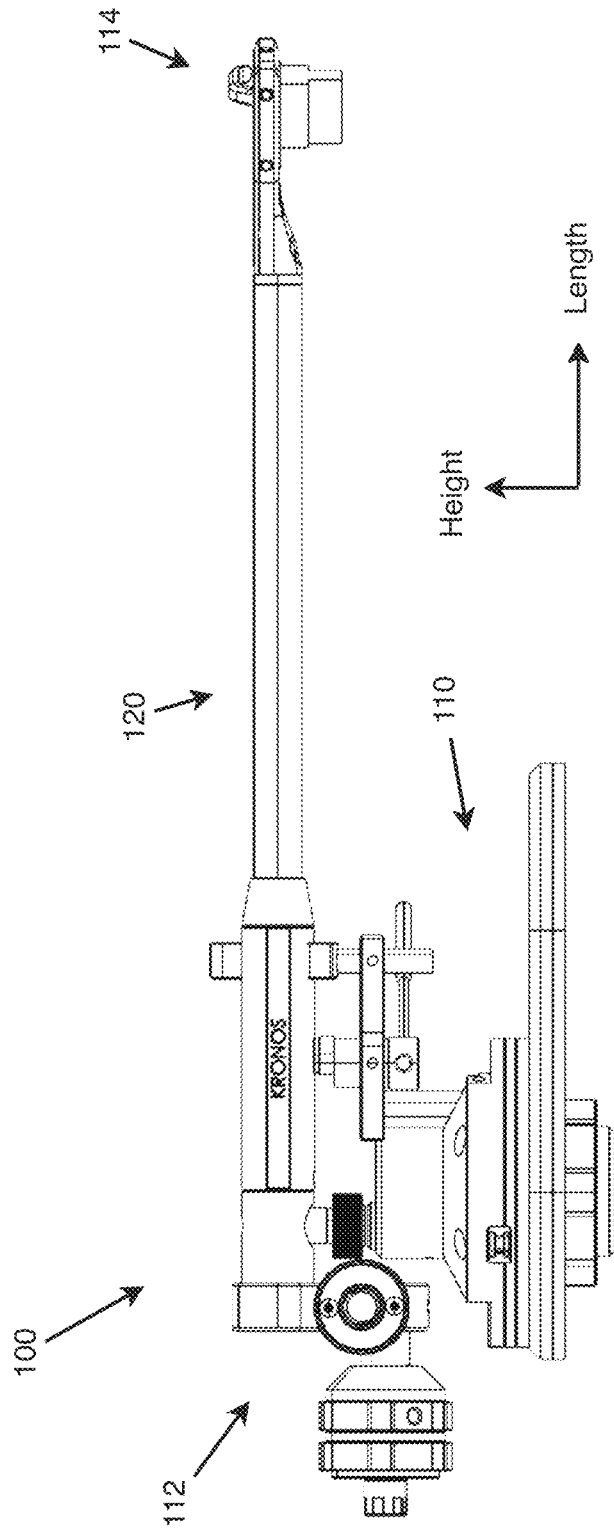


Fig. 2

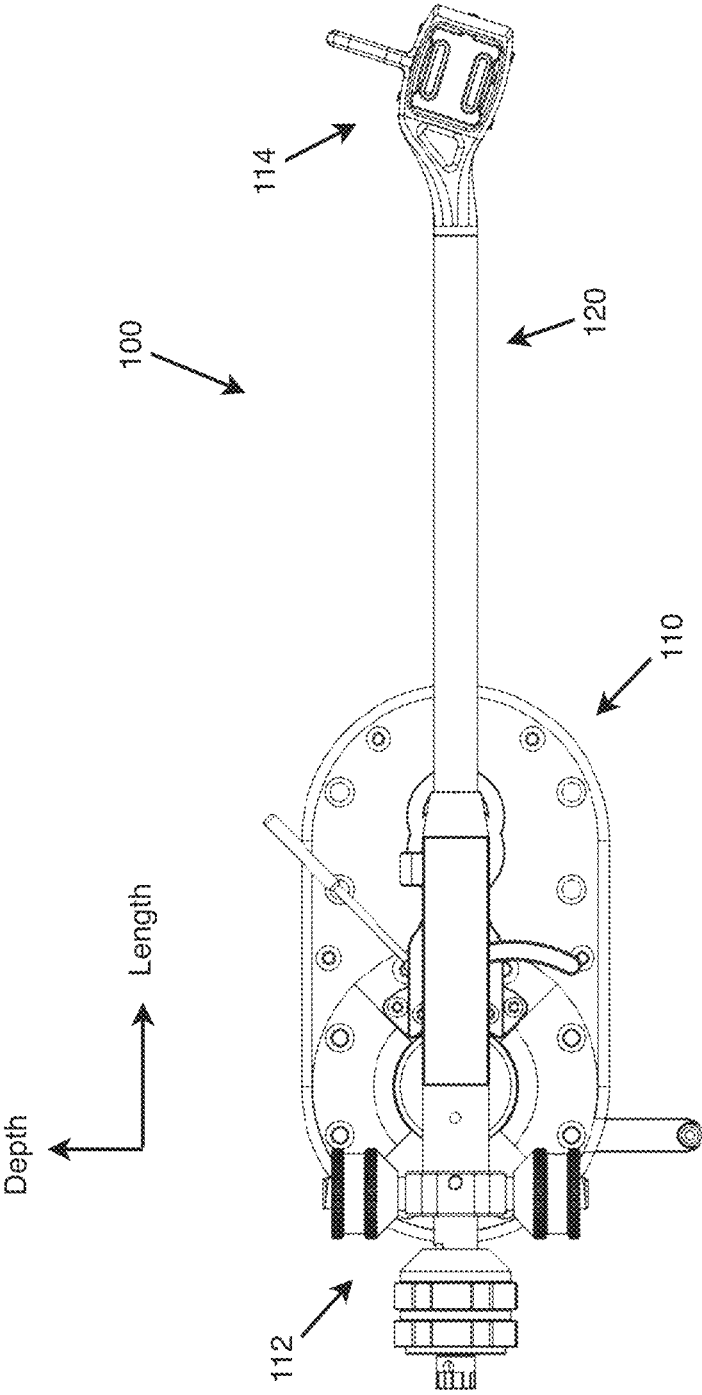


Fig. 3

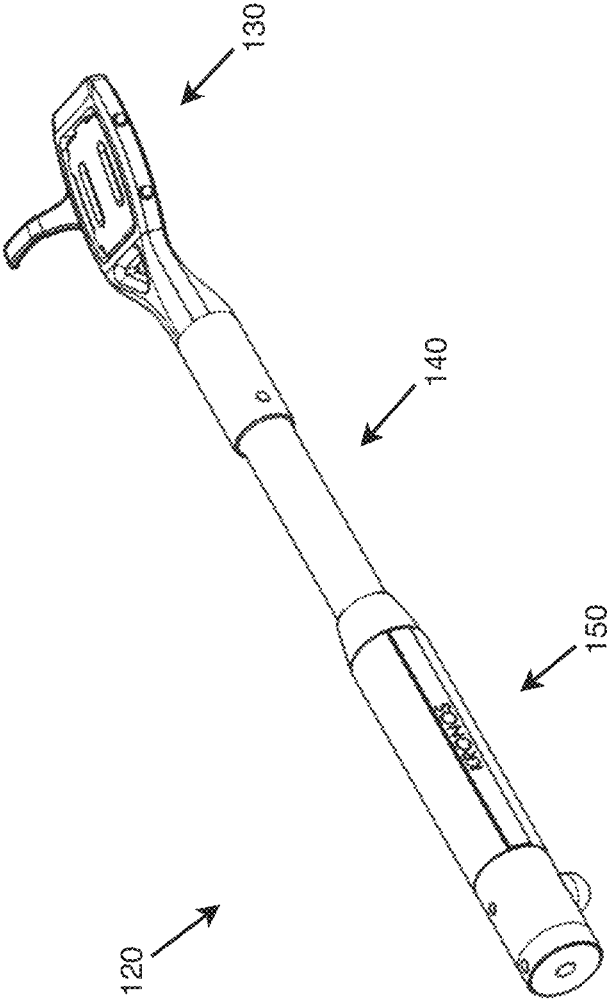


Fig. 4

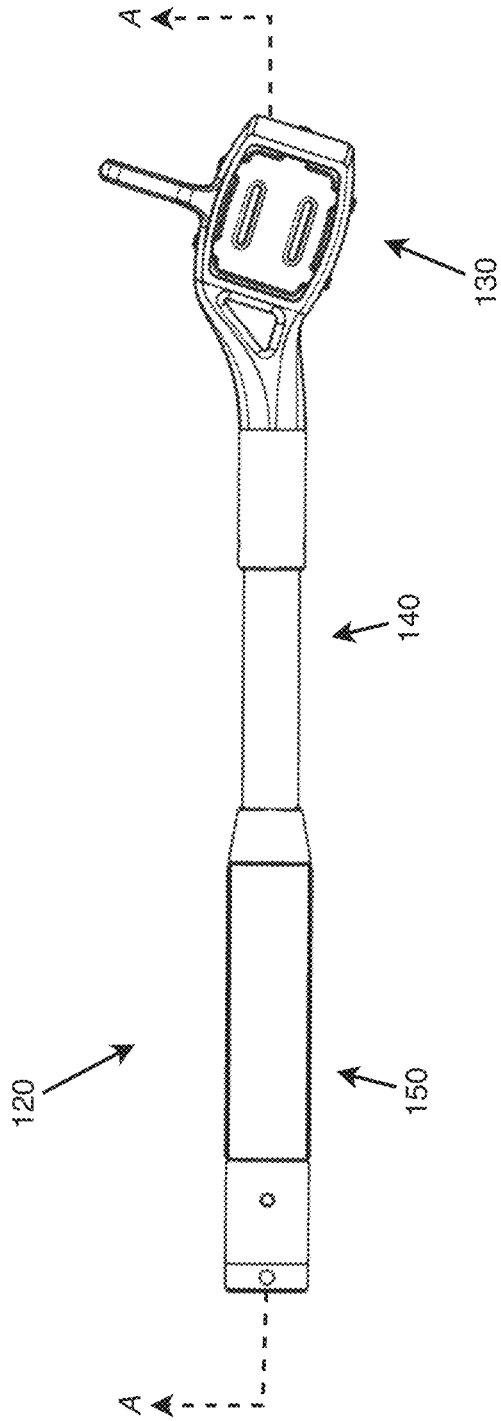


Fig. 5

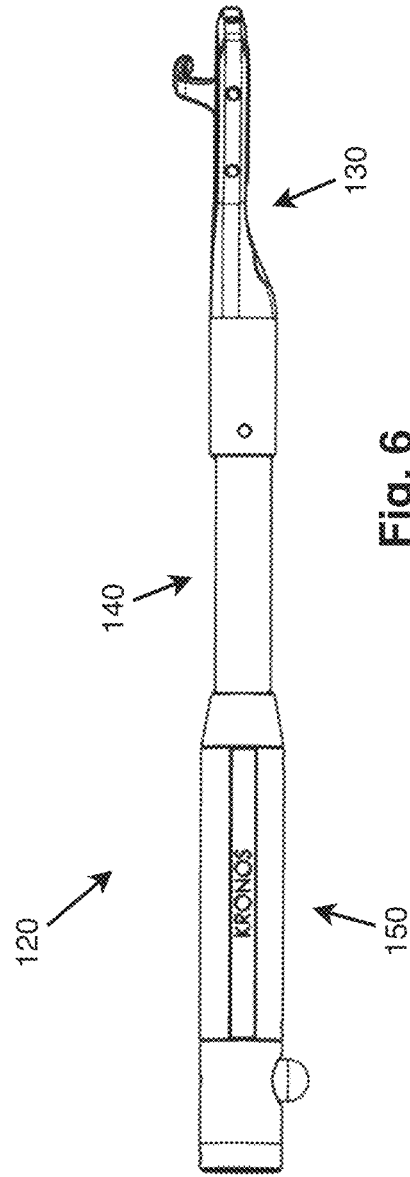


Fig. 6

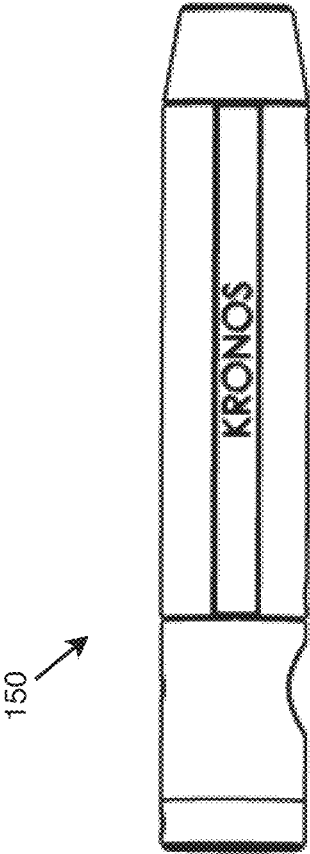


Fig. 7

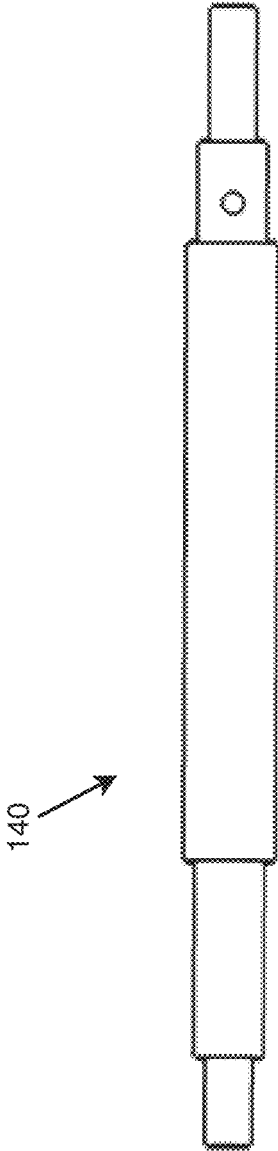


Fig. 8

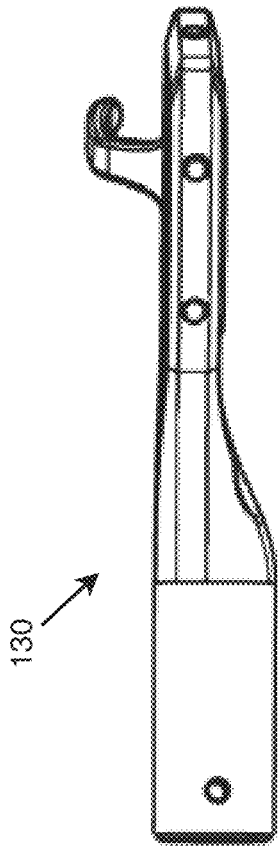


Fig. 9

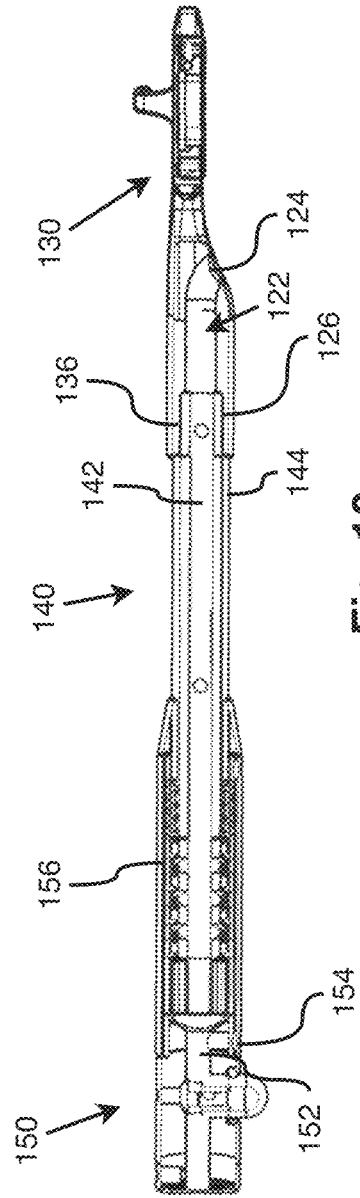


Fig. 10

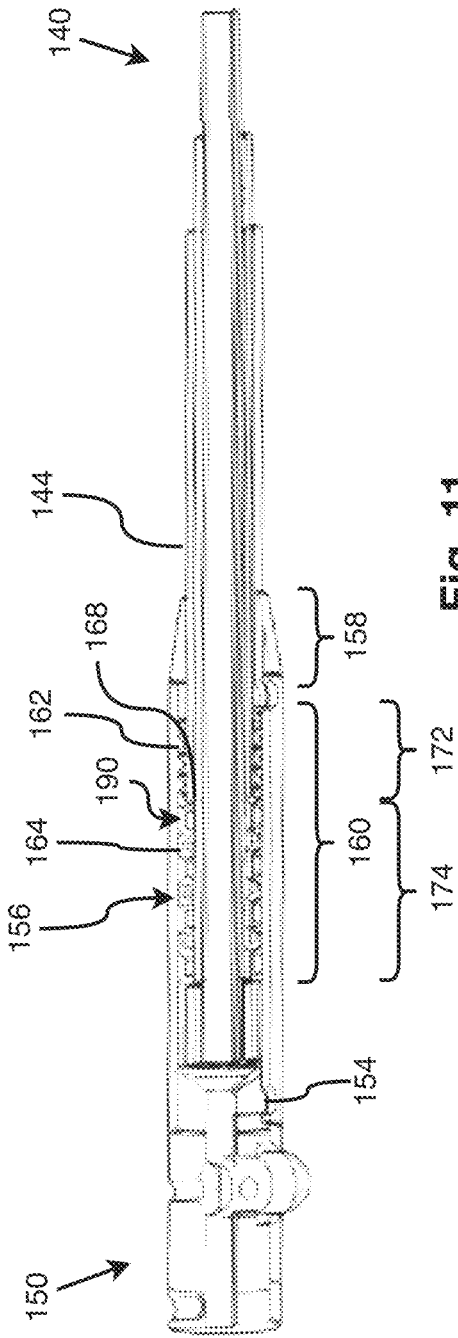


Fig. 11

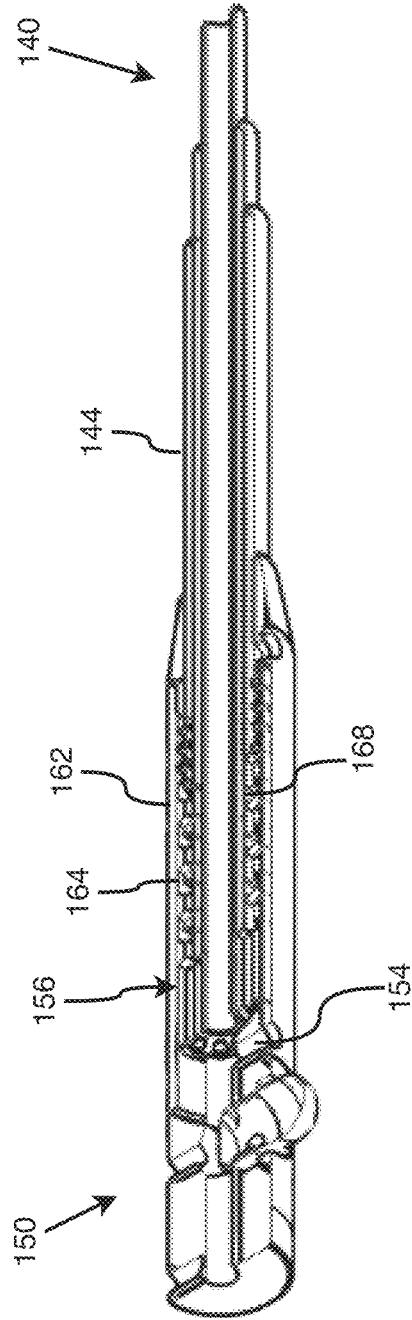


Fig. 12

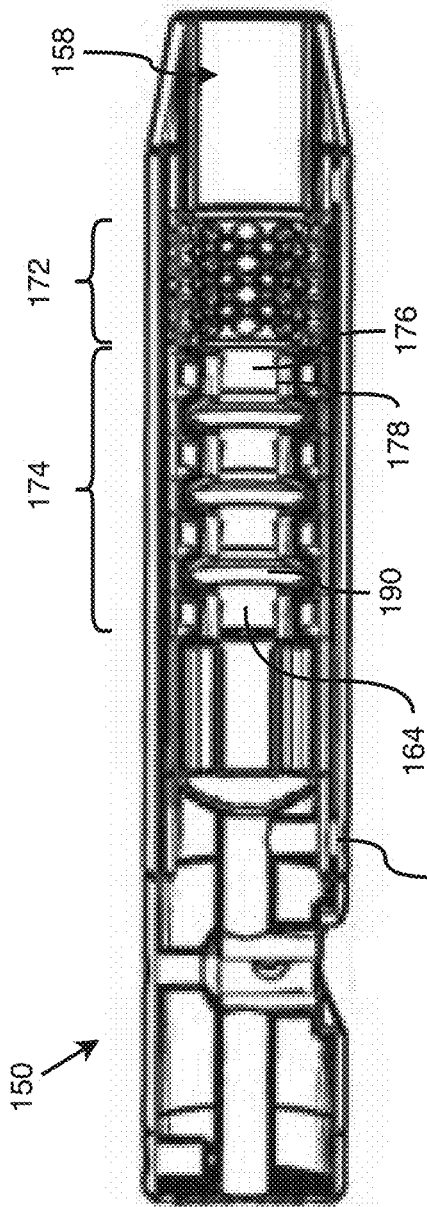


Fig. 13

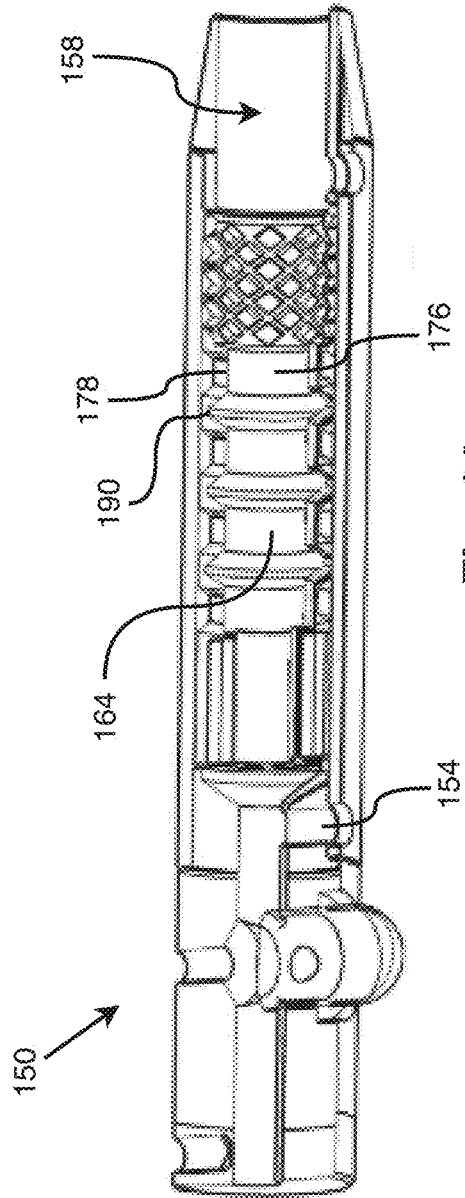


Fig. 14

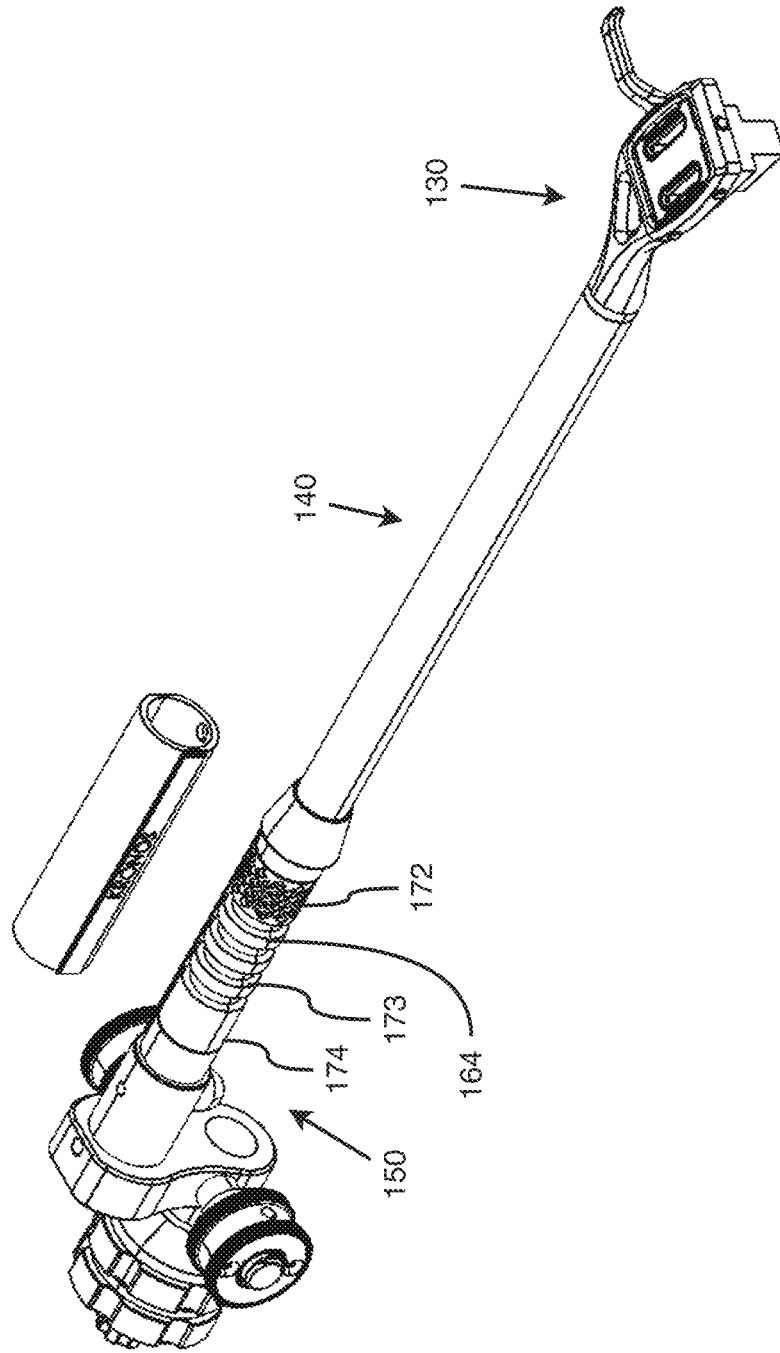


Fig. 15

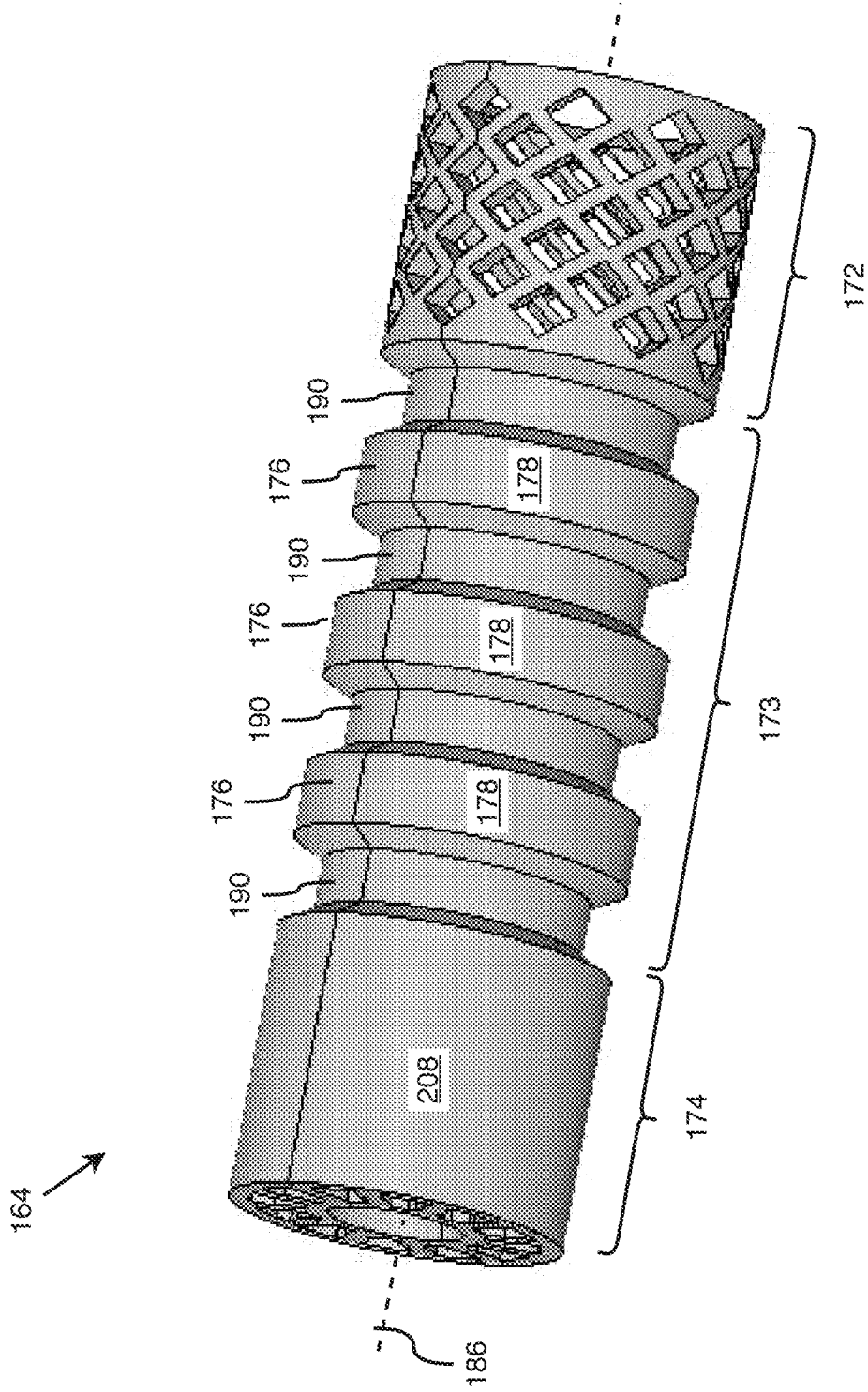


Fig. 16

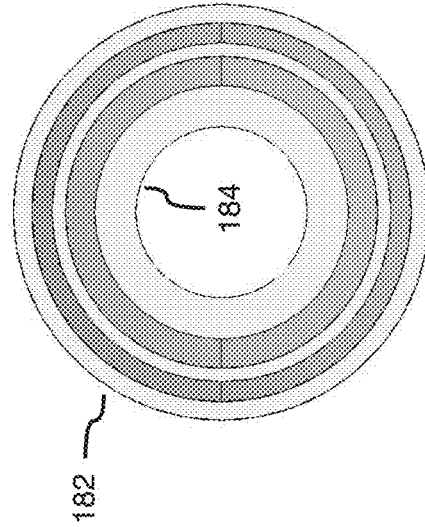
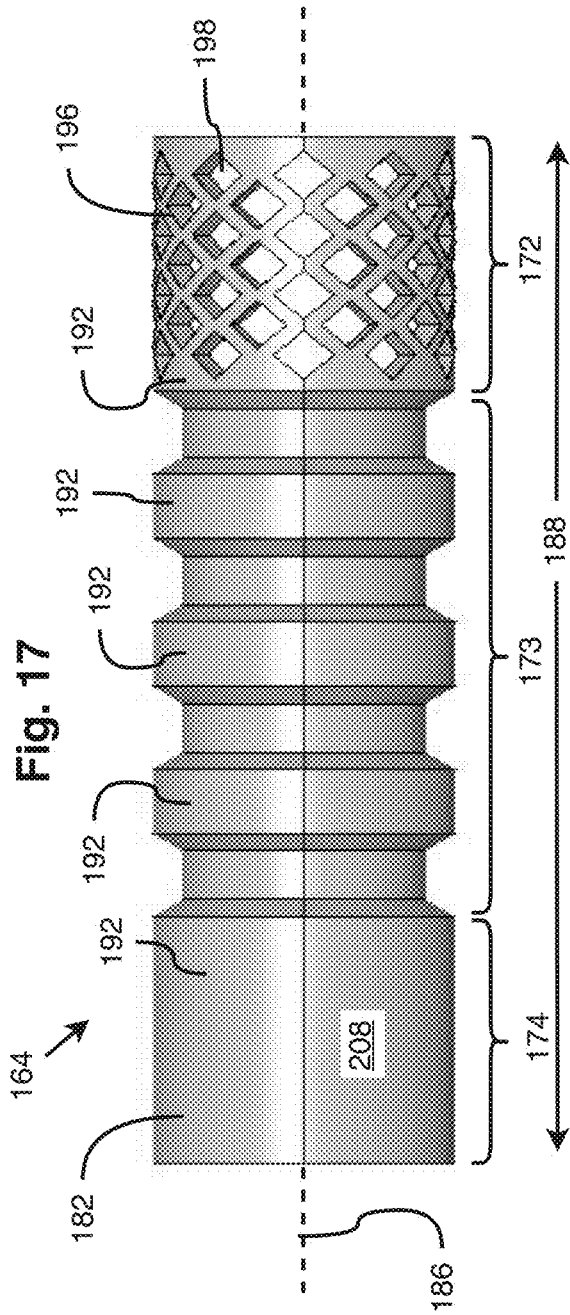


Fig. 18

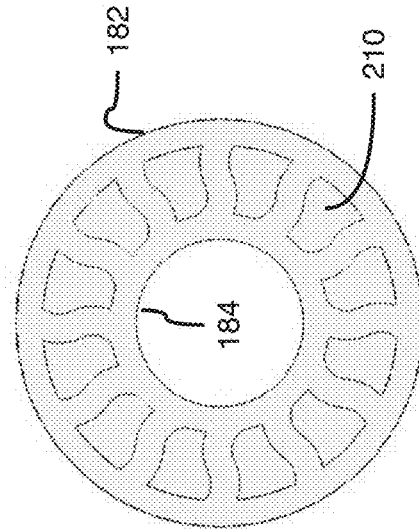


Fig. 19

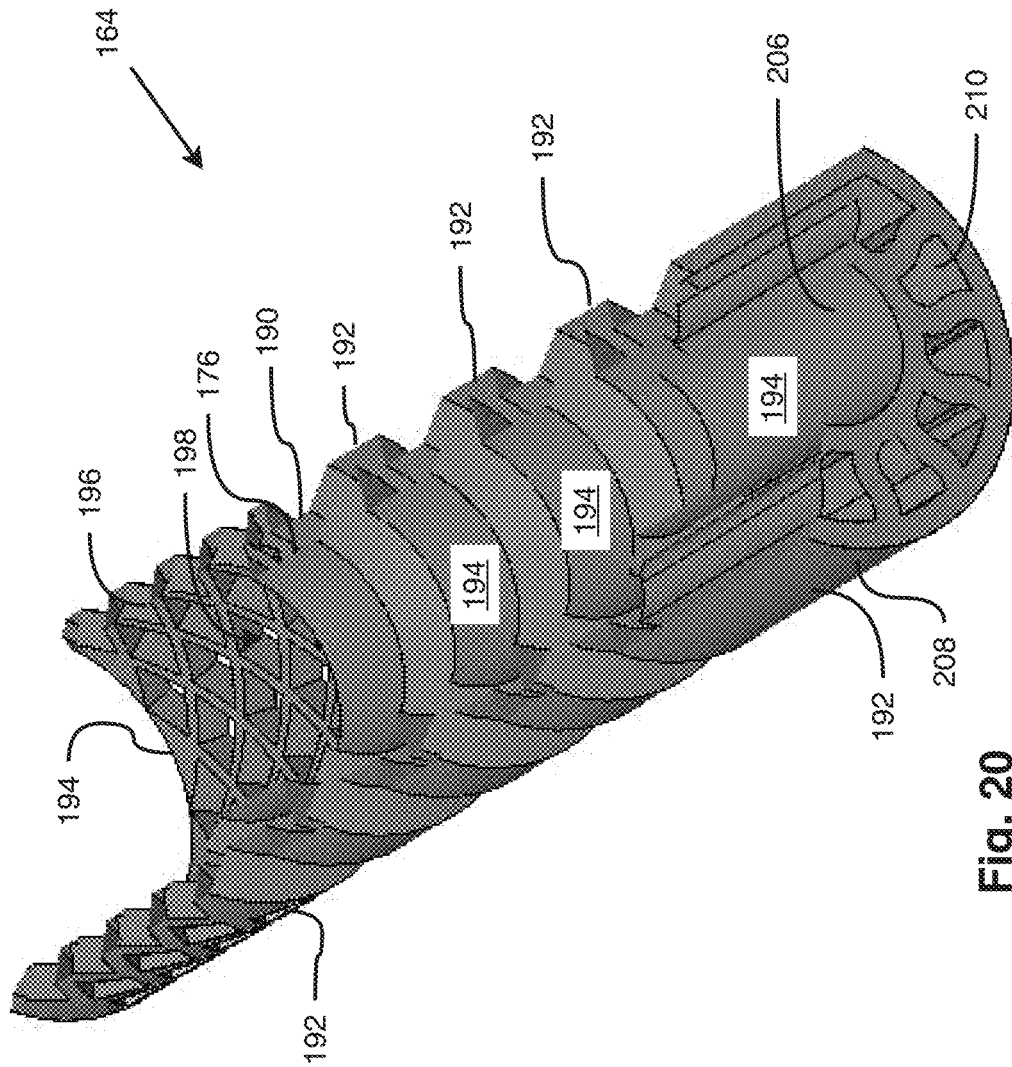


Fig. 20

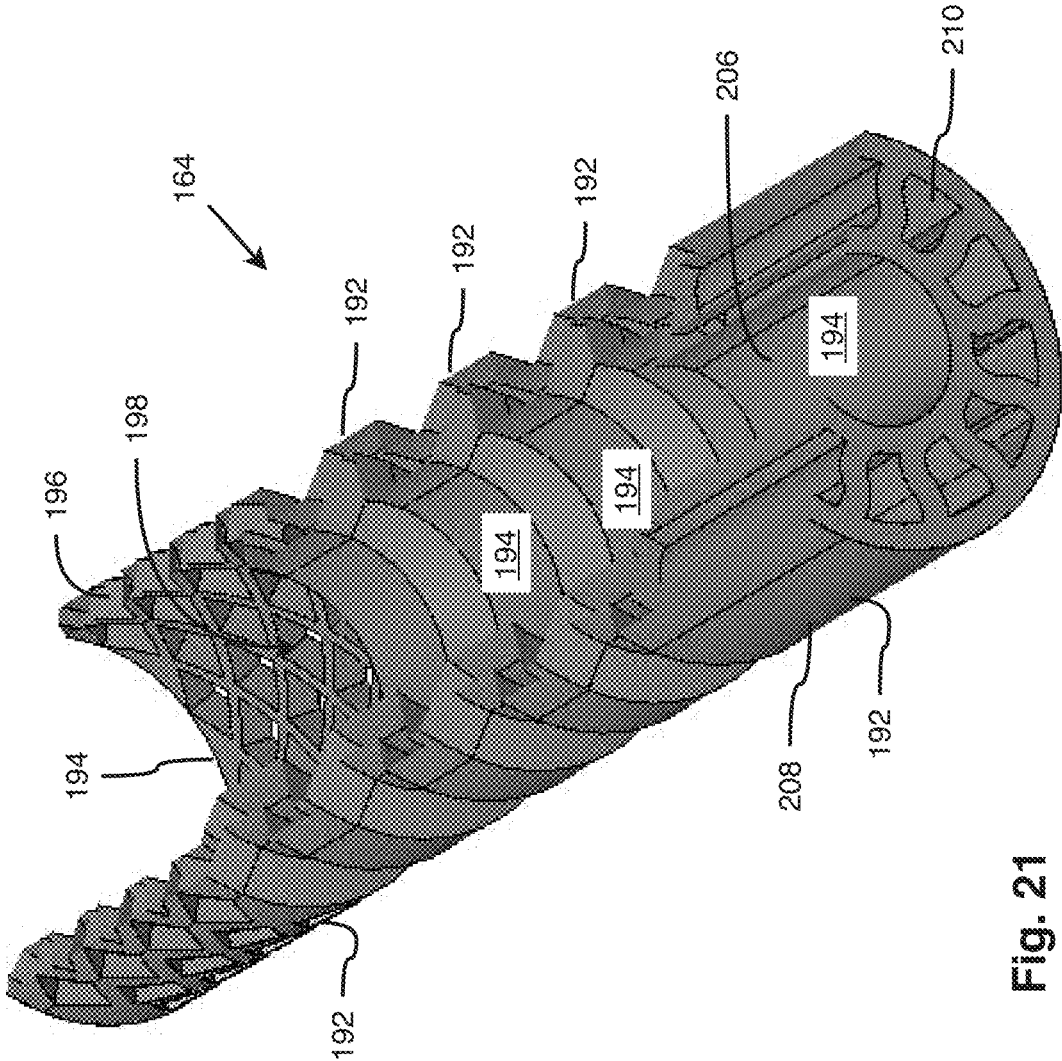


Fig. 21

RESONANT SUPPRESSOR FOR RECORD PLAYER TONE ARM

CROSS-REFERENCE TO RELATED APPLICATION

This application relates to and is a non-provisional application claiming priority under 35 U.S.C. § 119 (e) from U.S. provisional patent application Ser. No. 63/303,362, filed Jan. 26, 2022, under 35 U.S.C. § 111, entitled RESONANT SUPPRESSOR FOR RECORD PLAYER TONE ARM, the specification of which is hereby incorporated herein by reference in its entirety.

BACKGROUND

(a) Field

The subject matter disclosed generally relates to tonearm devices and assembly. More particularly, the subject matter disclosed relates to tonearm structure adapted for limiting communication of vibrations through the tonearm of a record player.

(b) Related Prior Art

A phonographic turntable, or record player typically includes a tonearm suspension system to control the positioning of a phonographic needle at specific points on a phonographic record. The tonearm is typically controlled such that unwanted record skipping or excessive bearing wear is prevented. However, current tonearms are not adequately designed to prevent unwanted vibrations to be communicated from the motor or more generally from the structure of the record player to the stylus tracking the grooves of a record and vice-versa. Such vibrations have a potential effect on the quality of the sound captures by the stylus when tracking a groove.

There is therefore a need for improvement in the tonearm to decrease such undesirable effects.

SUMMARY

According to embodiments, there is provided a tone arm for a record player comprising at least two sections mounted to each other using a vibration-damping technique damping vibrations that are potentially communicated along the length of the tone arm from one extremity to the other. In some aspects, the vibration damping technique encompasses the use of a mounting component comprising a plurality of discrete contact surfaces, and of a resilient adhesive able to absorb vibrations once cured.

In some aspects, the techniques described herein relate to a tone arm for a record player, the tone arm including an anterior arm section adapted for mounting a pickup cartridge thereto; a posterior arm section adapted for mounting the tone arm to the record player, the posterior arm section including an open chamber; and a mounting component mounted in the chamber with the anterior arm section mounted thereto, the mounting component including a plurality of discrete contact surfaces abutting one of i) anterior arm section and ii) the posterior arm section, whereby the mounting component secures the anterior arm section and the posterior arm section to each other.

In some aspects, the techniques described herein relate to a tone arm, further including an elastomeric adhesive securing at least one of a) the anterior arm section to the mounting

component; and b) the mounting component to the chamber of the posterior arm chamber.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component includes: an interior wall; an exterior wall; and at least one of i) a channel and ii) an opening extending therethrough between the interior wall and the exterior wall, wherein the elastomeric adhesive is deposited in the channel or opening.

In some aspects, the techniques described herein relate to a tone arm, wherein the elastomeric adhesive is adapted to damp vibration between the anterior arm section and the posterior arm section.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component includes at least one ridge having an apex providing one of the contact surfaces.

In some aspects, the techniques described herein relate to a tone arm, wherein one of the chamber and a secured portion of the anterior arm section has a cylindrical wall having a periphery, and wherein the ridge abuts the wall over the periphery.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component includes a channel located between two contact surfaces.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component has an interior wall, an exterior wall, a length and an axis; a ridge extending perpendicular to the axis at a location along the length of the mounting component over a first wall among the interior wall and the exterior wall; and a channel extending perpendicular to the axis at the location of the mounting component over a second wall among the interior wall and the exterior wall.

In some aspects, the techniques described herein relate to a tone arm, wherein one of the contact surfaces includes a lattice.

In some aspects, the techniques described herein relate to a tone arm, wherein the lattice includes crisscrossed radially extending walls with radial openings.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component has an axis, and wherein the mounting components have a plurality of radial openings extending side-by-side.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component has an interior wall, an exterior wall, an axis, and a partially hollow portion including a plurality of conduits extending parallel to the axis between the interior wall and the exterior wall.

In some aspects, the techniques described herein relate to a tone arm, wherein the mounting component has an interior wall, an exterior wall and an axis, the mounting component including at least two portions among a) lattice portion including crisscrossed radially extending walls; b) a ridged portion; and c) a partially hollow portion including a plurality of conduits extending parallel to the axis between the interior wall and the exterior wall, wherein the at least two portions provides the plurality of discrete contact surfaces.

In some aspects, the techniques described herein relate to a mounting component for mounting i) an anterior arm section adapted for mounting a pickup cartridge thereto to ii) a posterior arm section adapted to be mounted to a record player, the posterior arm section including an open chamber, the mounting component including a plurality of discrete contact surfaces abutting one of i) anterior arm section and ii) the posterior arm section, whereby the mounting component is adapted to secure the anterior arm section and the posterior arm section to each other.

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In some aspects, the techniques described herein relate to a mounting component, further including at least one ridge having an apex providing one of the contact surfaces.

In some aspects, the techniques described herein relate to a mounting component, further including a channel located between two contact surfaces.

In some aspects, the techniques described herein relate to a mounting component, further including an interior wall, an exterior wall, an axis, and a partially hollow portion including a plurality of conduits extending in parallel to the axis between the interior wall and the exterior wall.

In some aspects, the techniques described herein relate to a mounting component, wherein one of the contact surfaces includes a lattice of crisscrossed radially extending walls.

In some aspects, the techniques described herein relate to a mounting component, further including an interior wall, an exterior wall, an axis, and a partially hollow portion including a plurality of conduits extending parallel to the axis between the interior wall and the exterior wall.

In some aspects, the techniques described herein relate to a mounting component, further including an interior wall, an exterior wall, and an axis, wherein the mounting component includes at least two portions among a) lattice portion including crisscrossed radially extending walls; b) a ridged portion; and c) a partially hollow portion including a plurality of conduits extending parallel to the axis between the interior wall and the exterior wall, wherein the at least two portions provides the plurality of discrete contact surfaces.

Features and advantages of the subject matter hereof will become more apparent in light of the following detailed description of selected embodiments, as illustrated in the accompanying figures. As will be realized, the subject matter disclosed and claimed is capable of modifications in various respects, all without departing from the scope of the claims. Accordingly, the drawings and the description are to be regarded as illustrative in nature and not as restrictive and the full scope of the subject matter is set forth in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the present disclosure will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

FIG. 1 is a perspective-elevated view of a tone arm assembly comprising a tone arm mounted to its base in accordance with an embodiment;

FIG. 2 is a side view of the tone arm assembly of FIG. 1;

FIG. 3 is an elevation view of the tone arm assembly of FIG. 1;

FIG. 4 perspective elevated view of a tone arm in accordance with an embodiment;

FIGS. 5 and 6 are respectively an elevated view and a side view of the tone arm of FIG. 4;

FIG. 7 is a side view of the posterior arm section of a tone arm in accordance with an embodiment;

FIG. 8 is a side view of the bridge section of a tone arm in accordance with an embodiment;

FIG. 9 is a side view of the anterior arm section of a tone arm in accordance with an embodiment;

FIG. 10 is a plan cross-section view of the tone arm according to a cross-section plan A-A identified in FIG. 5;

FIGS. 11 and 12 are respectively a plan cross-section view and an oblique cross-section view of a posterior section assembly comprising the posterior arm section and the arm bridge according to the cross-section plan A-A identified in FIG. 5;

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FIGS. 13 and 14 are respectively a plan cross-section view and an oblique cross-section view of the posterior arm section of a tone arm according to the cross-section plan A-A identified in FIG. 5;

FIG. 15 is a perspective view of a tone arm with a shell portion of the posterior arm removed;

FIG. 16 is a perspective view of a mounting component in accordance with an embodiment;

FIG. 17 is a side elevation view of the mounting component of FIG. 16;

FIG. 18 is an axial elevation view of a first extremity of the mounting of FIG. 16;

FIG. 19 is an axial elevation view of a second extremity of the mounting of FIG. 16;

FIG. 20 is an oblique cross-section perspective view along its axis of the mounting of FIG. 16; and

FIG. 21 is an oblique cross-section perspective view offset and parallel to its axis of the mounting of FIG. 16.

It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

The realizations will now be described more fully hereinafter with reference to the accompanying figures, in which realizations are illustrated. The foregoing may, however, be embodied in many different forms and should not be construed as limited to the illustrated realizations set forth herein.

With respect to the present description, references to items in the singular should be understood to include items in the plural, and vice versa, unless explicitly stated otherwise or clear from the text. Grammatical conjunctions are intended to express any and all disjunctive and conjunctive combinations of conjoined clauses, sentences, words, and the like, unless otherwise stated or clear from the context. Thus, the term "or" should generally be understood to mean "and/or" and so forth.

Recitation of ranges of values and of values herein or on the drawings are not intended to be limiting, referring instead individually to any and all values falling within the range, unless otherwise indicated herein, and each separate value within such a range is incorporated into the specification as if it were individually recited herein. The words "about", "approximately", or the like, when accompanying a numerical value, are to be construed as indicating a deviation as would be appreciated by one of ordinary skill in the art to operate satisfactorily for an intended purpose. Ranges of values and/or numeric values are provided herein as examples only, and do not constitute a limitation on the scope of the described realizations. The use of any and all examples, or exemplary language ("e.g.," "such as", or the like) provided herein, is intended merely to better illuminate the exemplary realizations and does not pose a limitation on the scope of the realizations. No language in the specification should be construed as indicating any unclaimed element as essential to the practice of the realizations. The use of the term "substantially" is intended to mean "for the most part" or "essentially" depending on the context. It is to be construed as indicating that some deviation from the word it qualifies is acceptable as would be appreciated by one of ordinary skill in the art to operate satisfactorily for the intended purpose.

In the following description, it is understood that terms such as "first", "second", "top", "bottom", "above", "below", "posterior", "anterior" and the like, are words of convenience and are not to be construed as limiting terms.

It should further be noted that for purposes of this disclosure, the term “coupled” means the joining of two members directly or indirectly to one another. Such joining may be stationary in nature or movable in nature and/or such joining may allow for the flow of fluids, electricity, electrical signals, or other types of signals or communication between two members. Such joining may be achieved with the two members or the two members and any additional intermediate members being integrally formed as a single unitary body with one another or with the two members or the two members and any additional intermediate members being attached to one another. Such joining may be permanent in nature or alternatively may be removable or releasable in nature.

The terms “top”, “up”, “upper”, “bottom”, “lower”, “down”, “vertical”, “horizontal”, “interior” and “exterior” and the like are intended to be construed in their normal meaning in relation with normal installation of the product, with an indication of the normal orientation of the tone arm assembly **100** and its components being provided on FIG. **1**.

In realizations, there are disclosed a tone arm assembly **100** for installation on a record player.

It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

Referring now to the drawings, and more particularly to FIGS. **1** to **3**, the tone arm assembly **100** comprises a base **110** and a tone arm **120** having a posterior portion **112** about the base **110** and an anterior portion **114** distant from the base **110**. The base **110** is motorized for driving the elevation and rotation of the tone arm as the tone arm **120** at its anterior end holds a pickup cartridge (not depicted) over the groove of a record. The stylus of the pickup cartridge is adapted for tracking the groove with the desired force to give the optimal compromise between good tracking and minimizing wear of the stylus and record groove. Therefore, the function of the tone arm **120** may be summarized as a pivoted lever, free to move in two axes (vertical and horizontal) with a means to maintain tracking pressure.

Referring to FIGS. **3** to **6**, the tone arm **120** is adapted to minimize the vibrations communicated along the length of the tone arm **120** and that would decrease the quality of the sound picked up by the stylus mounted thereon.

The tone arm **120** comprises an anterior arm section **130**, a bridge section **140** and a posterior arm section **150** mounted to each other. The anterior arm section **130**, the bridge section **140** and the posterior arm section **150** are designed with physical characteristics (combination of material, dimensions comprising length, inner diameter, outer diameter, moment of inertia, etc.) in such a way that their natural frequencies of vibration of the three sections **130**, **140**, **150** are different. As a result, the vibrations communicated through the tone arm **120** are damped both by the structure of the components of the tone arm **120** and by the assembly process of the anterior arm section **130**, bridge section **140** and the posterior arm section **150** to each other as explained hereinafter.

Practically, the posterior arm section **150** is adapted to be mounted to the base **110**, while the anterior arm section **130** is adapted for the pickup cartridge to be mounted thereto.

It is worth mentioning that the bridge section **140** may be considered to be part of the posterior arm section **150** without departing from the scope of the present description.

Referring to FIGS. **7** to **9**, the anterior arm section **130**, the bridge section **140**, and the posterior arm section **150** are manufactured independently from each other and are afterwards assembled to provide the tone arm **120**.

According to realizations, the assembly of the anterior arm section **130**, the bridge section **140** and the posterior arm section **150** may be permanent, or only one of the mountings, responsible for most of the vibration damping, is a permanent assembly.

Referring to FIG. **10**, the tone arm **120** defines a channel **122** therein in which passes the wiring (not depicted) connecting the pickup cartridge to a signal processor. The channel **122** comprises an anterior opening **124** facing partially downward toward the location of the stylus once installed, extends throughout the bore **142** of the tubular bridge section **140**, and extends axially into an axial passage **152** of the posterior arm section **150** up to the opening **154** about the mounting position of the posterior arm section **150** to the base **110**.

The bridge section **140** features a cylindrical exterior face **144**. Its front extremity is adapted to be inserted into the cylindrical chamber **136** of the anterior arm section **130** and its rear extremity is adapted to be inserted into the cylindrical chamber **156** of the posterior arm section **150**.

Referring additionally to FIGS. **11** to **14**, the cylindrical chamber **156** comprises an anterior section **158** and a posterior section **160**, wherein the anterior section **158** is adapted to provide some clearance avoiding contact between the bridge section **140** and the posterior arm section **150** as the tone arm **120** may undergo some external forces. The posterior section **160** is adapted to provide the grip to e.g., permanently, hold the bridge section **140** in such a way as to provide the required rigidity for the stylus mounted about the anterior portion **114** to properly track the groove of a record while limiting the vibrations that one or the other of the extremities of the tone arm **120** may pick up from, e.g., the structure and the motor of the record player or the record being not absolutely flat.

The posterior section **160** has mounted thereto a mounting component **164** for connecting the exterior face **144** of the bridge section **140** to the interior face **162** of the chamber **156**. The mounting component **164** comprises a plurality of discrete contact surfaces connecting, e.g., abutting, the exterior face **144** and the interior face **162**, the discrete contact surfaces providing in-between channels **190** wherein vibration may be damped. On the interior side, the connection between the mounting component **164** and the exterior face **144** is secured using an elastomeric adhesive **168** being able, once cured, to undergo small deformation due to vibration without wear or cracks resulting therefrom.

Therefore, the mounting component **164** provides means for mounting components of the tone arm **120** to each other, wherein, for instance, the bridge section **140** may be considered part of the anterior arm section **130**.

In a preferred realization, the elastomeric adhesive **168** consists of a naval-type resin, e.g., elastomeric epoxy, that remains relatively flexible once cured.

Referring additionally to FIG. **15**, in a preferred realization, the mounting component **164** comprises an anterior portion **172**, an intermediary portion **173**, and a posterior portion **174** each providing at least one contact surface designed to abut a section of the tone arm **120**, wherein the portions **172**, **173**, **174** provide a different geometry, thus responding differently to vibration frequencies.

Referring now to FIGS. **15** to **21**, the mounting component **164** comprises an exterior wall **182** to be mounted through its periphery to the posterior arm section **150**, and an interior wall **184** to be mounted through its periphery to the anterior arm section **130** through the bridge section **140**. The mounting component **164** has a generally cylindrical geometry, an axis **186** and a length **188**. The mounting

component **164** has a plurality of discrete external contact surfaces **192** and of discrete internal contact surfaces **194**.

The anterior portion **172** has a net-like shape comprising a lattice of crisscrossed radially extending walls **196**, preferably substantially thin walls, extending at an angle other than zero (0), aka parallel to the axis **186**, and ninety (90) degrees, aka perpendicular to the axis **186**. The crisscrossed geometry of the crisscrossed radially extending walls **196** defines openings **198**, preferably a plurality over the length of the anterior portion **172**, allowing deformation of the preferably substantially thin walls **196**, and/or for applying elastomeric adhesive **168** therein. The anterior portion **172** further provides a uniform internal contact surface **202** and a uniform internal contact surface **204** punctuated with areas without contact where are openings **198**.

The intermediary portion **173** comprises at least one, but preferably a plurality of ridges **176** with channels **190** separating the ridges **176**. In a preferred embodiment, the ridges **176** and channels **190** are extending along a plane perpendicular to the axis **186** of the mounting component **164**. In a preferred embodiment, the mounting component **164** in the intermediary portion **173** has a W shape in which ridges **176** and channels **190** are opposed to one another, wherein the opposed ridge **176** and channel **190** are one facing outward while the other facing inward. The channels **190**, facing inward or outward, are designed to separate the exterior wall **182** and the interior wall **184** into discrete contact surfaces **192**, **194**.

Accordingly, the intermediary portion **173** has e.g., a lengthwise corrugated shape of e.g., three (3) and four (4) external/internal ridges **176** each having an apex **178** that is axially spaced apart from each other lengthwise, limiting the communication of vibrations undergone by one ridge to its neighbor ridge. The channels **190** in the intermediary portion **173** or between the portions **172**, **173**, **174** provide a space for the elastomeric adhesive **168** to fill at least partially when curing.

The posterior portion **174** has a generally cylindrical shape partially hollow having a uniform internal contact surface **206** and a uniform external contact surface **208**, with conduits **210** extending parallel to the axis **186**, wherein the conduits **210** ease deformation of the posterior portion **174**.

Preferably, the mounting component **164** is made of material designed to damp vibrations through small deformations and/or the presence of pores, for example molded pulp, or molded fiber of density and with port-processing adapted for that use.

Preferably, the mounting component **164** is adapted to surround the whole periphery of the bridge section **140**, the mounting component **164** having a tubular, cylindrical, shape.

According to other embodiments, part of the mounting component **164** may provide a generally spiral-like contact surface, or a series of radial, potentially parallel contact surfaces. Regardless of the embodiments, it is preferable that the resulting configuration of the contact surfaces is adapted to resist movement in any radial direction, aka in any outward direction around the bridge section **140**.

Accordingly, the connection between the posterior arm section **150** and the bridge section **140** damps and limits communication of vibrations over the length of the tone arm **120** that may potentially decrease the efficacy of the record player, thus providing a resonant suppressor there-between.

While preferred embodiments have been described above and illustrated in the accompanying drawings, it will be evident to those skilled in the art that modifications may be

made without departing from this disclosure. Such modifications are considered as possible variants comprised in the scope of the disclosure.

The invention claimed is:

1. A tone arm for a record player, the tone arm comprising: an anterior arm section adapted for mounting a pickup cartridge thereto;
- a posterior arm section adapted for mounting the tone arm to the record player, the posterior arm section comprising an open chamber; and
- a mounting component mounted in the chamber, the mounting component comprising i) a first contact surface for butting against the anterior arm section and ii) a second contact surface butting against the posterior arm section, whereby the mounting component secures the anterior arm section and the posterior arm section to each other,

the mounting component comprising a plurality of mounting-component sections having a different wall structure selected from the group of wall structures consisting of:

- a) a wall structure consisting of crisscrossed radially extending walls;
 - b) a wall structure comprising, in longitudinal sequence, a first channel that does not butt against a first arm section among the anterior arm section and the posterior arm section, a radial ridge that butts against the first arm section, and a second channel that does not butt against the first arm section; and
 - c) a wall structure providing a first face that butts against the anterior arm section and a second face that butts against the posterior arm section, the wall structure comprising a plurality of hollow conduits extending longitudinally between the first face and the second face,
- wherein each one of the mounting-component sections is made of a different one of the wall structures whereby each one of the mounting-component sections is transmitting longitudinally sound waves differently.

2. The tone arm of claim 1, further comprising an elastomeric adhesive securing at least one of:

- a) the anterior arm section to the mounting component; and
- b) the mounting component to the chamber of the posterior arm section open chamber.

3. The tone arm of claim 2, wherein the elastomeric adhesive is deposited in the first and second channels.

4. The tone arm of claim 2, wherein the elastomeric adhesive is adapted to damp vibration between the anterior arm section and the posterior arm section.

5. The tone arm of claim 2, wherein the elastomeric adhesive is deposited in openings between the crisscrossed radially extending walls.

6. The tone arm of claim 1, wherein the crisscrossed radially extending walls make a lattice.

7. The tone arm of claim 6, wherein the lattice comprises radial openings.

8. The tone arm of claim 7, wherein the mounting component has a plurality of the radial openings extending side-by-side.

9. The tone arm of claim 1, wherein the anterior arm section comprises a mounting surface,

wherein a first one of the plurality of mounting-component sections provides a first contact section that butts against the mounting surface of the anterior arm section,

wherein a second one of the plurality of mounting-component sections provides a second contact section that butts against the mounting surface of the anterior arm section, and

wherein the first contact section and the second contact section are isolated from each other over the mounting surface of the anterior arm section.

10. The tone arm of claim 1, wherein the posterior arm section comprises a mounting surface,

wherein a first one of the plurality of mounting-component sections provides a first contact section that butts against the mounting surface of the posterior arm section,

wherein a second one of the plurality of mounting-component sections provides a second contact section that butts against the mounting surface of the posterior arm section, and

wherein the first contact section and the second contact section are isolated from each other over the mounting surface of the posterior arm section.

11. A mounting component for coupling two arm sections comprising i) an anterior arm section adapted for mounting a pickup cartridge thereto, and ii) a posterior arm section adapted to be mounted to a record player, the posterior arm section comprising an open chamber, the mounting component comprising:

i) a first contact surface for coupling to the anterior arm section; and

ii) a second contact surface for coupling to the posterior arm section with the anterior arm section mounted thereto,

wherein one of the first contact surface and the second contact surface comprises a plurality of discrete contact sections for butting against a corresponding arm section wherein the discrete contact sections provide together a noncontinuous contact surface between the mounting component and the corresponding arm section, and

wherein the plurality of contact sections differ from each other at least in at least one of i) in shapes of the contact sections, and ii) in sizes of the contact sections.

12. The mounting component of claim 11, further comprising at least one ridge having an apex providing one of the contacts sections.

13. The mounting component of claim 11, further comprising a channel located between two contact sections.

14. The mounting component of claim 11, further comprising an interior wall, an exterior wall, an axis, and a partially hollow portion comprising a plurality of conduits extending in parallel to the axis between the interior wall and the exterior wall.

15. The mounting component of claim 11, wherein one of the contact sections comprises a lattice of crisscrossed radially extending walls.

16. The mounting component of claim 11, further comprising an interior wall, an exterior wall, and an axis, wherein the mounting component comprises at least two portions each having a different wall structure selected from the group of wall structures consisting of:

a) a wall structure consisting of crisscrossed radially extending walls;

b) a wall structure comprising, in longitudinal sequence, a first channel that does not butt against a first arm section among the anterior arm section and the posterior arm section, a radial ridge that butts against the first arm section, and a second channel that does not butt against the first arm section; and

c) a wall structure providing a first face that butts against the anterior arm section and a second face that butts against the posterior arm section, the wall structure comprising a plurality of hollow conduits extending longitudinally between the first face and the second face,

wherein the at least two portions provides the plurality of discrete contact sections.

17. The mounting component of claim 11, wherein at least two of the plurality of discrete contact sections are between the mounting component and a single one of the of i) the anterior arm section and ii) the posterior arm section.

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